

# NASA TECH BRIEF



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## Fatigue of Reinforced Concrete Beams under Dynamic Loading

A study, consisting of a literature survey and experiments, was conducted to determine the strength properties of reinforced concrete beams subjected to vibrational stresses. A better knowledge of the dynamic properties of concrete is necessary in the design of buildings with concrete beams to be located in areas subjected to high-intensity vibrations, such as near missile launching sites and jet air fields.

Approximately 100 specially designed, scaled reinforced concrete beams were tested. Fifteen percent of these beams were tested statically to determine their static strength. The remaining beams were tested under sinusoidal and random vibrations to determine their dynamic fatigue characteristics. The beams were mounted, one at a time, on an electromagnetic shaker and were vibrated at their supports. Desired stress levels were maintained by monitoring the input signal to the shaker. The number of vibration cycles was established up to the moment of the specimen's failure. The reinforcing wires imbedded in

the concrete beams were also tested by a tensile machine to determine their yield and ultimate tensile strength, and to give a better analytical understanding of the strength of the reinforced concrete specimens.

### Note:

A report detailing the results of the study may be obtained from:

Clearinghouse for Federal Scientific  
and Technical Information  
Springfield, Virginia 22151  
Price \$3.00  
Reference: B68-10515

### Patent status:

No patent action is contemplated by NASA.

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